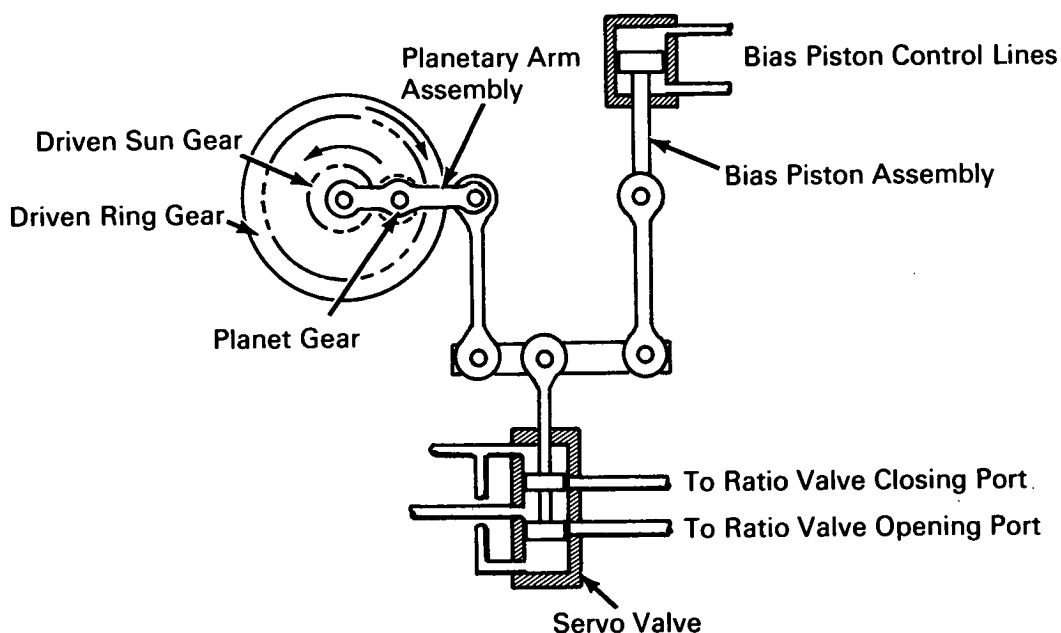


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Concept for Planetary Gear System to Control Fluid Mixture Ratio



FLUID MIXTURE RATIO CONTROL

The problem:

To maintain, by mechanical means, a constant pre-selected flow ratio of two fluids.

The solution:

A mechanical device to sense and correct for fluid flow departures from the selected flow ratio.

How it's done:

The device consists of a planetary gear train in which the sun gear and ring gear are rotated by force of flow in the fluid supply lines to which they are connected, at rotational velocities proportional to the driving fluid velocities. When velocity of the fluids

is in proper proportion, as determined by the planetary gear ratio selected, there is a null reaction on the third or planet gear element of the system and an arm attached to this gear will produce no force or motion. Any departure in the ratio of the two controlled fluids from that which results in the null condition of the planet gear will cause the arm to move in a direction related to the direction of flow ratio change and at a rate related to flow ratio rate of change. The motion of this arm is used to operate a servo valve system that increases or decreases fluid flow resistance in the appropriate passages until the selected flow ratio is restored.

(continued overleaf)

Notes:

1. This system has been considered for control of rocket engine propellant mixture control but could find use wherever control of the flow ratio of any two fluids is desired.
2. This development is in conceptual stage only, and, as of date of publication of this Tech Brief, neither a model nor prototype has been constructed.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B66-10477

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: James D. McGroarty
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center
(M-FS-1785)